Illuminating real-time data intelligence so that resources are directed to save lives and improve quality of care

Human Interest Story

Predictive Analytics

At a glance

Industry:
Government

Partner:
Pulselight

Location:
Ohio, USA

Context:
Leverage advanced and predictive data analytics
to fight against the opioid epidemic and its cost to
human life

Our Response:
Vertica Analytics Platform

Impact:
· Early intervention improves patient outcomes and
  can save lives
· Better allocation of state resources ensures acute
  care for the most vulnerable
· Enhanced quality of care

Focus Area:
Predictive Analytics

pulselight

Pulselight was born from the urgent and rapidly growing
need to transform the quality, efficiency and cost of how
everyone experiences healthcare. The team includes former
executives of healthcare organizations, investigative leaders,
data scientists, and engineers. The Pulselight team all want to
invent things that significantly improve lives.

14 Ohioans die every day from Opioid Use Disorder (OUD)

With an opioid abuse epidemic taking hold all across the USA, Ohio has the second largest death rate from opioid abuse of all the USA states, with at least 14 Ohioans dying every day from Opioid Use Disorder (OUD). This makes it the leading cause of injury-related death and is an indication of how serious the opioid epidemic is. Between 2001 and 2016, overdose deaths more than quadrupled.

Four in 10 adults with OUD are on Medicaid. Medicaid is the largest source of funding for medical and health-related services for people with low income in the United States, providing free health insurance to nearly 75 million low-income and disabled people. Apart from the obvious cost to human lives, there is also an economic cost for the Medicaid plan to take into account. The medical cost of looking after a person with OUD is double that of the medical costs of a person without OUD. This gets worse over time, because as the OUD develops, the risks of long-term health effects, and overdose, increases exponentially, along with the cost factor.

The children of Ohio are also suffering due to the heroin and opioid epidemic. Teachers in Vinton County, Ohio, buy shoes for their students whose addicted parents send them to school in footwear held together with tape. The foster care and child-protection system in Ohio now houses close to 14,000 children, many of whom were removed from their families because of addiction.

Use data analytics to identify at-risk patients, before it is too late

Jason Helmandollar, Healthcare Solutions Lead at Pulselight, explains further: "The situation is critical and needs urgent support. With help from grants, we are able to bring data analytics innovation to Ohio. We have a real window of opportunity to identify at-risk patients, before it is too late for them. The data we have at our disposal consists of millions of records from Medicaid claims, all regional hospitals, doctors, pharmacies, the FDA, etc. By leveraging the power of analytics we want to support targeted intervention, education, and policy-making—saving lives and costs. We needed a solution to help us combine and correlate massive volumes of data in real-time to give us the instant feedback we need to act immediately."

The goal is to make data actionable and accessible to all types of users. With analytics and action working together, at-risk patients can be located geographically for early intervention or education. Problematic prescribers and pharmacies can also be identified in this way.

"Vertica illuminates the intelligence hidden in our data."

Jason Helmandollar, Healthcare Solutions Lead, Pulselight

Processing 1.5 billion records daily to gain meaningful insights into patient's lives

The Pulselight solution architecture supports state-wide data sharing. It consists of a data layer that takes in huge volumes of data from a variety of sources. The data is fused, cleansed, and enriched, before it passes through the Vertica Analytics Platform for real-time metrics correlation.

Helmandollar comments: "Leveraging Vertica, we can transform our data into analytically useful metrics, from a patient, prescriber, and pharmacy perspective. With so many data sources we can correlate information on a patient's average daily morphine milligram equivalents (MME), their average daily supply, even if it encompasses multiple and overlapping prescriptions, dangerous drug combinations, their time on opioids, and a treatment, overdose, and diagnostic history."

Taking millions of prescriptions and extrapolating this into a per-day MME picture for individual patients soon adds up, and the Pulselight system can process up to 1.5 billion records each day. To get meaningful insight, a high performance data analytics solution is the only answer, according to Helmandollar: "Vertica illuminates the intelligence hidden in our data. Through an interactive web-based application, it gives our stakeholders real-time answers to complex questions, so that state resources are allocated where they have the greatest impact on lives and costs."

> "Vertica helps us simplify a huge volume of complex and hard-to-find data with lightning speed, enabling us to meet our mission of identifying individuals at high risk of overdose."
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> Irene Manautou Williams, CEO, Pulselight

Analytics and action work together for early patient intervention

Pulselight, leveraging the power of Vertica, uses data analytics to identify, stratify, and locate short-term at-risk patients. Analytics is then followed up through physical action, in the form of urgent outreach, education, or intervention programs. For example, based on Pulselight's analytics, educational letters are sent to patient populations, or notification letters to the providers who are over-prescribing. The outcomes are fed back into the system, so that results are measured and tracked over time, and patient programs are adjusted or repeated where successful.

Irene Manautou Williams, CEO of Pulselight: "Early intervention is key in combating the opioid epidemic and avoiding associated cost escalation. Vertica helps us simplify a huge volume of complex and hard-to-find data with lightning speed, enabling us to meet our mission of identifying individuals at high risk of overdose."

In the case of letters to providers, Pulselight can see that the number and amount of opioid prescriptions decrease for those notified providers, or those who attend educational sessions. With at-risk patients, the Pulselight system shows that certain individuals have their first treatment for substance use disorder after outreach has been made.

By optimizing the available data, Pulselight can focus on the most vulnerable populations, such as children, the elderly, or neonatal abuse cases, for immediate impact. Helmandollar concludes: "Vertica helps us identify and predict high risk providers, pharmacies, and patients. Early intervention means we connect high risk patients with education, training, treatment, wellness programs, and substance abuse services. This improves the quality of care, reduces costs, and ultimately saves lives."